

THE ROLE OF RHYTHMIC PATTERNS IN CHILDHOOD¹

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We have come to think of rhythmic activity as an integral part of almost all processes in the living organism. Rhythmicity is demonstrated not only in such things as the chemical and electrical aspects of physiological functioning, but also in the breathing, feeding, sucking, and peristalsis of infants. Crying is a more or less rhythmic expression. It was long ago found that the infant is comforted by rocking in its uncomfortable periods or times of distress. The rocking cradle was standard equipment for the child. Rocking chairs for nursing mothers are no longer fashionable, but it is reported that they too were a great comfort to young infants.

If we follow the maturational process in the asynergic, incoordinated newborns as they develop cephalocaudad motor control, we see a certain number of them, usually healthy in every discernible way, supplying their own rhythmic patterns. By the time they are 2 to 3 months of age, a few of them are rocking their own heads, the only part of their bodies over which they have some voluntary control. By the time they are 6 to 10 months of age, more of them are rocking their heads and a few others have gone into more dramatic forms of rhythmic activity such as banging their heads actively against their crib headboards or getting up on their hands and knees and rocking rhythmically back and forth.

This study reports the observations in 130 such children. The youngest child encountered in this type of activity began it at 1 month of age—the latest onset was at 2 years. About 5% more boys are involved than girls. In all these children these movements were definitely voluntary and without nystagmus,

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appearing to be thus differentiated from spasmodus nutans and similar involuntary head movements.

With some of the children these rhythmic movements are transitory. In others they remain for months, or even years. In an unselected pediatric clinic population 15%-20% of the children had rocked, banged, or swayed in one form or another for a longer or shorter time. In private practice the figure is smaller, 10%. In the 5% of children in which these patterns last longer they go on usually until the child is 2½ to 3 years old. Occasionally, however, we see it prolonged much past this point. We have seen it persisting in pure form in children up to 12 years of age. In the older children this rocking or swaying behavior is in some cases continuous from infancy, while others return to it under varying conditions. But in the vast majority, as the children have gotten older, these larger rhythmic patterns have changed in form instead of being dropped completely.

Sooner or later the children appear to realize that the adults around them are concerned about these motor activities. The adults want to do something about the hair that's rubbed off by the head roller and the bruises and callouses of the head banger. The noise made by the crib as it is rocked across the floor has had considerable nuisance value such as broken leases and irritable neighbors. Many pressures are put on these children to modify these activities. Many ingenious contrivances have been devised to harness the disturbing and supposedly aimless movement, sometimes justifiably, to allow the rest of the family a night's sleep. In spite of the ineffectiveness of such restraints and devices the prognosis is better than it is for snoring. The children either eventually decide to conform to the wishes of their elders, no longer need the larger rhythmic patterns, or else they substitute other patterns for them. We see a variety of partializations of the original rhythmic forms or isolation of the movement to one part of the body. Examples are rhythmic toe curling,

tooth grinding, ear pulling, finger tapping, nose rubbing, and skin scratching, among many possible variations. Many of these substitutes can be carried into adult life, often acquiring other uses and values. Other repetitive activity forms which appear about the time of spontaneous disappearance of rocking and swaying are the stereotyped play patterns described by Bender and Schilder as *impulsions*(2).

CONSIDERATIONS ON CLINICAL VARIETIES OF CHILDHOOD RHYTHMIC PATTERNS

When we examine these motor phenomena of a repetitive nature in early childhood we see them as apparently having a common denominator at their onset and for a varying period afterward. In origin they appear to represent an attempt to experience movement for the kinesthetic sensations that play an important rôle in the infant's development(8). In this connection Mahler(19) has observed that motor release is the most important and soundest device of the growing child to serve ego growth and obtain balance. These rhythmic activities seem at this point to provide a means for helping the infant in its mobilization to achieve control. There are apparently wide variations in the constitutional needs of different children for such movement play and experience, and it seems to be more marked in children whose control over motility is less easily developed. In some cases there seems to be a familial tendency to this type of movement. For example, one mother, who together with her 2 sisters had rocked their beds, now had 3 children who rocked their beds.

Clinically, the most common time for the onset and use of rhythmic motor patterns is when an infant is in the transition between one stage of growth and development and the next. A classical instance is the child who can only sit but is struggling with a drive to stand which it cannot carry through. At this point it may be found either beginning, or having an exacerbation of, rhythmic body movements. These often become diminished or drop out completely after maturation has proceeded far enough to allow it to stand. When this same child is ready to take its first step out on its own but keeps falling, then rocking, shaking, or

head rolling may recur or again become more active. This phenomenon may occur too in the face of deprivation. At any point in its course a secondary value may become prominent, and the repetitive movement then seems to take on the nature of an additional need or satisfaction in addition to its organizing and mobilizing effect.

In some infants these rhythmic movements seem to have a predominantly pleasure value. The 6-month infant who sways, rocks, or shakes when music plays has been described as obtaining movement pleasure(16). This is seen in older children too in the face of lack of play outlets, monotony of interest and life, as in orphanages and institutions for mental defectives. In addition to the "pleasure from movement" factor there are a number of children who only rock when they are pleased with what they have accomplished, such as when they have had a particularly satisfying meal, are praised, are successful, admired, or having pleasant thoughts. It has been observed in this connection that in some children thumbsucking sometimes seems to represent more than a need for oral-sucking satisfaction. In such infants and children, it is usually found that they suck their thumbs particularly after their hunger appears to be completely satisfied. In such individuals it appears to be different from the drive to satisfy sucking needs. At such a stage, thumbsucking and its substitutes may be equated with the pleasure-expressing use of the other rhythmically repeated motor phenomena. Examples are the infant who didn't suck its thumb before feedings and when hungry, but sucked it for hours after apparent satiation of its hunger; the child of 6 who sat and rocked whenever he did anything pleasing to himself or was praised when he had the right answers in school; the 12-year-old girl who audibly and rhythmically sucked her tongue only when happy and when listening to musical selections she liked.

Probably in the over-all picture of their use the most widespread function of the rhythmic motor patterns in children is to express and relieve tension and anxiety. Kubie(15) feels that "manifestations even of normal repetitiveness arise from the recurrence of ungratified demands; in other

words, when an instinctual demand encounters delay or ultimate frustration. To such an experience the child's inevitable reaction must be to try again, to restate its tension and need by whatever method of expression it has learned to use." Mahler(19) has observed that motor release forms an always available safety valve against anxiety. While the origins of the rocking and other rhythmic forms observed in this series usually are not in tension-producing situations, they are often used sooner or later to announce and/or try to relieve apprehension, dissatisfactions, anger, threats, boredom, pain, and frustration. Where this secondary value has become prominent, it is the chief cause of their persistence past one year of age. Their correlations with thumbsucking in this regard are striking. Indeed, thumbsucking at times is interchangeable with bed rocking, etc. The greatest use of these manifestations in relieving tension is as a prelude to sleep. If awakened, the infant who uses this "relaxational expedient"(10) must rock its body or roll its head to fall asleep again. One infant was encountered whose parents rocked it to sleep in a Taylor Tot every night and therefore it didn't have to rock itself. However, if it wakened, the parents would have to remove it from bed and rock it again. A 6-months-old infant may be mentioned who began rocking its head when the family was moving, stopped after a month, began again at 18 months when family moved again. There was also the 11-months-old boy who began rocking when his family was preparing to move and stopped when the parents were able to be more relaxed on arrival in a new home in another city.

This tension-relieving or expressing rôle seems to be closely related to another function served by these movements, that of supplying compensatory satisfaction. This is true in children whose movement is restricted, as Levy has shown in his studies on movement restraint. Many forms of stereotyped rocking or swaying movements are found in children confined by illness or in cribs, playpens, tied down in hospital beds, etc. Interesting correlations have been made between these patterns in children and the headshaking behavior of closely confined hens, the weaving tics of horses confined to

their stalls, the upsweeping head movements of caged bears(18). Illness in particular may initiate rhythmic movement forms. Children with chronic limiting illnesses such as severe congenital heart disease are not unusually found to resort to this type of activity in the absence of any other. Acute illness may foster a return to previously present but long gone rocking or swaying.

This principle applies equally as well to children whose motility is constricted or disturbed on an intrinsic basis as it does to those with environmentally imposed movement restrictions. Thus some infants with organic brain damage resulting in considerable loss of motility will adopt rhythmic patterns to the limit of their ability to move. Then too, the child who is able to get around, but whose motility is awkward, distorted or frustrating, will seek compensatory motor satisfaction in stereotyped patterns of movement.

The same principle would seem to be applicable to children with "head-rolling rickets." The children presenting this symptom have, in addition to weakness, reportedly also shown bone changes which delay the acquisition of motor skills.

Similarly, children who are frustrated from achieving intellectual satisfactions have been seen to select this form of expression of dissatisfaction and/or compensatory satisfaction. Since mental defectives often have both inferior motility and ability to adjust it should not be surprising that many of them indulge in repetitive patterns of a motor nature, increasing in degree as they are increasingly unable to adapt successfully to the demands of their environments. Apparently in such defective children these manifestations can become very readily fixed and exaggerated as a form of satisfaction. In fact, it is so prominent in this group that some recent pediatric texts describe head rocking and banging as indicative of mental deficiency.

Characteristic of the entire group in which motility disturbances, confinement, frustration, and deprivation are prominent is the usual disappearance of the repetitive rocking or swaying and their substitutes, once the movement restraint is relieved, the disturbed

motility is corrected, or better compensatory satisfactions are provided.

Another group in which these rhythmic body movements seem to serve a purpose includes older children with special problems limiting not only motility but also perception. A 7-year-old boy with 70%-80% loss of vision on a hereditary basis displayed a rhythmic swaying and whirling in preparation for carrying out requests or initiating any unfamiliar activity or game. Such whirling is reported to be not uncommon in blind children(21).

An 11-year-old moderately severe cerebral spastic girl of normal intelligence, who had great speech difficulty, rhythmically rocked back and forth in situations where she particularly wanted to be clearly understood, and then she could come out with intelligible speech. One wonders whether in such cases the rhythmic movements do not supply a means of overflow of distracting and poorly directed motor impulses, providing a mobilizing factor much like the rhythmic patterns some stutterers use before they can get a word started.

Childhood schizophrenia provides still another opportunity to observe rhythmic forms of motility. Some schizophrenic children spend hours in rhythmic body play. An island of intact perception and contact with reality is often found in such children in their interest in, and response to, classical music, which can often quiet them in disturbed periods. In these cases the stereotyped, repetitive body movements appear to be in the nature of regressive phenomena, a return to infantile motility patterns, representing a return to a narcissistic level of movement satisfaction. These children can be thought of as being deprived of their usual motor outlets in the presence of the catastrophic process which has involved, among many other functions, their ability to use or obtain satisfactions from many of the motor skills they had developed before their illness.

One variety of rhythmic movement pattern which does not fit into any of the previous categories is the apparently normal infant who rocks only in its sleep. This form begins when the child is able to get up on its hands and knees or can sit up. It rarely persists beyond 2½ to 3 years of age. It is not a

"relaxational expedient" in Gesell's terms, although some of these children do rock themselves to sleep in addition. The sleep rocking begins sometimes hours after the child has fallen asleep and may continue for hours. It will stop if the child is awakened. (It does not depend on darkness as does spasmus nutans, because it occurs during daytime naps too.) More striking possibly than the rocker is the infant who bangs its head while sound asleep, in some cases sitting up. Some of these children seem to be not completely asleep.

Five cases, 2 girls and 3 boys, have come to attention in whom bed rocking and body swaying are the presenting or prominent symptoms later in childhood. In each of these children, ranging in age from 7 to 12 years, the persistent symptom had its roots in early childhood, but in 2 of them it had dropped out of sight for 2 and 4 years respectively. An example of this group is a passive, repressed, anxious, unhappy, 9-year-old Italian-American girl of average intelligence who, from 1 to 3 years of age, had rocked from side to side in her sleep, lying on her back with her right arm tucked under her. At 7 she was exposed to a series of shifting environments because her promiscuous, alcoholic mother refused to care for her. In each foster home she began rocking in her sleep within a week of placement, persisting in it until she was returned home by sleepy-eyed, baffled foster parents. The rocking would then stop until her mother placed her again. This pattern continued for 2 years until the mother's asocial activities brought her a penitentiary sentence. After the girl was prepared for a placement with her maternal grandmother with her mother out of the picture, no further rocking was evident.

THE NATURE AND SOURCES OF THE RHYTHMIC MOVEMENT

Explorations into the characteristics of rhythm, actively carried on from 1890 to 1920(22), have been summarized by Elcanon Isaacs(13) as indicating that there is no rhythmic experience which is limited to one form of sensation. Rhythmic experience is a grouping of auditory, kinesthetic, tactful, and visual stimuli. These are interrelated and depend on each other.

Titchener's extensive observations(25) led to his feeling that the existence of the kinesthetic sensation is primarily linked to auditory stimulation, probably chiefly due to contraction of the tensor tympani of the middle ear. This thesis seems to be borne out by the head banger in whom the auditory sensation produced by its activity is not only an integral part of the rhythmic movement but appears to be its most important component, although the vestibular apparatus is also concerned. Following out this premise a series of preliminary experiments were attempted. A metronome was set in action at the bedside of 2 diurnal, purposeful head bangers and 2 children who banged their heads in their sleep. The children ranged in age from 12 months to 26 months. When the metronome was set at the same tempo that the child was using in its head banging it invariably stopped the activity. The sleeping children remained asleep but quiet. When the metronome was stopped, only the daytime head bangers sooner or later (3 to 15 minutes) resumed the head banging. When the metronome beat was slowed, one of the awake and consciously aware children returned to its own preferred rhythmic tempo. One of the sleeping children woke up. When the metronome was speeded up, they all stopped their movement but resumed it within 15 minutes after the superimposed rhythm was stopped. These maneuvers were also tried with one sleep rocker but he did not stop his rocking.

The extremely small numbers involved in these uncontrolled experiments would in themselves make them unreliable. It must also be considered that the supposedly substitute auditory stimulus could have had a predominantly distracting value. They are, however, mentioned here as a basis for speculating on the rôle of the auditory experience in the head banger and to point a direction for further exploration.

Sherrington(23) felt that the ultimate basis of all rhythmic experience rests on a series of definite time units. Subjective time units or "mental time beats" have been postulated(13) and this is confirmed in the children studied here. In the great majority of the children who rock, roll, bang, or sway the pacemaker is the heart beat. Possibly

this also has an auditory component since, as reported by Clausen, a great many individuals can distinctly hear their own pulses, with the sound localized to their ears. When the rhythmic movement is used for expression or relief of tension, anger, or any situation that will increase heart rate, the rate of rhythmic movement increases correspondingly but not always to the same extent as the rise in pulse. This is true not only for the body rocker or the head banger, but is also dramatically displayed by the older thumbsucker who, when disturbed, will suck its thumb furiously. The increased rate of the rhythmic activity seems not only to serve the purpose of stating and relieving the child's upset state, but also seems to serve a homeostatic function in that the rhythmic movement often has a retarding effect on the heart rate at such times.

In a minority of the children in this series the pacemaker is the breathing rate. The same acceleration with anger or stress and the secondary retarding action operates in these cases as is found where the pulse provides the subjective time unit. Possibly this phenomenon adds to the evidence of a physiological basis for Coleman's(5) clinical observation that rhythm of movement is the essential factor in development of endurance and postponement of fatigue.

Somewhat fragmentary but impressive evidence has been accumulated (summarized by Kubie(15)) which indicates that there is a basis in organic brain structure and physiology for repetitive behavior. Brickner's work in which stimulation of a certain brain area produces repetitive speech phenomena is indicative of such an organic function. In Kubie's own experimental work on ablation of certain cortical zones in monkeys, perseverating acts have sometimes resulted. Freeman and Watts(7) in their postoperative observations on prefrontal lobotomy patients report similar perseverative behavior. Clinically, in the epilepsies and some postencephalitics, repetitiveness in activity patterns is characteristic. Kubie concludes, "The brain is so organized as to offer a physiological substratum for automatic repetitiveness, both of fragments of behavior and of more complex patterns of behavior."

It is felt that such a concept of a neurophysiological basis for repetitive, stereotyped activity may be needed to explain the sleeping bed rocker and head banger. One wonders if during sleep, with cortical inhibition diminished, reflex motor expression of rhythmic activity of the brain at rest is not permitted. Adrian(1) points out that "the physical source of an act may be thought of as a more or less stable pattern of electrical eddies forming itself in some part of the brain. The pattern, like a system of ripples, may expand and dominate the brain for the time being or it may remain in the larval form, ready to grow when the conditions are favorable to it." Since the rhythmic motor activities in some children are suspected of supplying a fundamental need by playing a part in the expression of instinctual drives and furthering ego growth, one wonders, when the use of the repetitive motility patterns is not compatible with the conditions and pressures in a child's environment, whether these patterns may not be suppressed but remain in larval form, in Adrian's terms, ready to be expressed when conditions are more favorable, as during sleep.

One cannot leave a discussion of the nature and sources of the need for rhythmic expression in the infant and child without being tempted to speculate on the rôle of prenatal factors. This has been mentioned but discarded, but the possibility of persistence of remnants or memory traces of intrauterine experience is not remote and cannot be discounted entirely(11). During its intrauterine existence the foetus is constantly exposed to a variety of rhythmic experiences, the most prominent of which is the aortic pulse which can often be easily palpated through the pregnant uterus in the later stages of pregnancy. It is conceivable that during times of stress or tension the infant could be, through rhythmic body activity, attempting to recreate the conditions of the period of its life in which it had its greatest security.

THE USE OF THE RHYTHMIC MOVEMENT

We may possibly better understand the child's use of rhythmic movement if we scrutinize the rhythmic and movement com-

ponents separately. First, considering the repetition of movement, Susan Isaacs(14) has summarized its most obvious uses in children as an impulse to growth, and as a means of developing movement skills by repeating movements, at the same time providing a form of pleasure. Children, like adults, freely use movement as one of the manifestations through which they express their dissatisfaction or discomposure. The anxiety-driven child may not infrequently be hyperactive. Conversely, anxiety or tension may be found in the child who becomes less active, easily fatigued, or lethargic.

Considering the rhythmic component of such stereotyped movement, it was accepted as far back as the Greek dance and expressed by Darwin that "emotional expression belongs to rhythmical forms"(6). Wundt felt from his studies(26) that rhythm has a large element of affective tone associated with it, that it arises from feelings of expectation and satisfaction, and that it depends on repetition of feelings of tension. In fact, rhythm is defined as movement in time, characterized by alternation of tension and relaxation.

On the basis of this evidence it is suggested that rhythm and movement serve similar rôles and complement each other in their association to further growth, express tension and pleasure, and achieve relaxation.

Howard Hanson, approaching the problem from the musician's viewpoint of the effects of rhythm, points out(12) that rhythm is the modality through which effects are largely obtained which are soothing or exhilarating, quieting or disturbing:

Everything else being equal, the further the tempo is accelerated from the pulse rate—the greater becomes the emotional tension.

If the rhythm is regular and the accents remain strictly in conformity with the basic pattern, the effect may be exhilarating, but will not be disturbing.

Rhythmic tension is heightened by the extent to which the dynamic accent is misplaced in terms of metric accent.

It would seem that Hanson's postulates recognize the same basis for the use of rhythm in music as has been seen here in the child expressing or attempting to relieve its tension, expressing pleasure and anger. Looking further, we can suspect the latter

purpose not only in popular music as Hanson had, but also in such mobilizing and tension-building activities as the war dances of primitives.

At some time or other in its course most parents and many doctors equate the child's bed rocking and some of the other repetitive movements with genital masturbation. There is no clear evidence for this equation in the younger children in terms of the rhythmic activity being a substitute for genital masturbation. We can confirm Langford's observations that erections do not occur as part of such activity in boys. However, a rare individual has been seen who was frustrated by parents in masturbation during the phallic stage and who then returned to rhythmic motor patterns. Under these circumstances the old rhythmic patterns seemed to be serving a new function in these older children, appearing to some extent to have acquired the same values as the denied form of masturbation.

THERAPEUTIC CONSIDERATIONS

It is only a relative minority of parents who become concerned about the varied rhythmic manifestations in their children, because if the rhythmic patterns do not get out of bounds or take on other values most parents seem to realize intuitively their normalcy. Where the repetitive movements have become more than annoying or reached symptom proportions, the problem of relieving them has been approached from 3 aspects. First, in those cases where it has been troublesome and appeared to have taken on values other than its normal ones in growth and development, an attempt has been made to replace the rhythmic movement with a rhythmic auditory stimulus (as described earlier) with the intent of interrupting the undesired activity. Results have been variable, but in a few cases it has been reported by parents that sometimes, once the movement pattern is replaced or substituted for by tapping or by using a metronome, the child does not resume the rocking that night. One parent bought a loud-ticking alarm clock, and reported that the bed rocking disappeared except for occasional recurrences.

A second and somewhat more fruitful approach has been to attempt to make

the rhythmic movements purposeful. One mother put the swaying and rocking to music with reportedly good results in relieving the inconvenient rocking. Hobby horses, swings, see-saws, participation in rhythm bands, eurythmics, etc., have been prescribed for such children, but again with variable results. Of 10 children so approached parents reported definite decrease in frequency and intensity of the rhythmic activity in 2, and definite "cures" in 2 others. Since all 4 children were 18 to 28 months of age it must be considered (18) that they were possibly ready to give up the rhythmic patterns in any case. However, in blind children this approach was almost specific in relieving the need to precede activity with swaying or whirling.

Probably the most constructive approach when these repetitive patterns are found is to use them as an indication that one should scrutinize the emotional climate and environment in which the child is functioning, looking particularly for constrictions and tension-producing conditions, as Langford suggests (17). This is particularly true in children over 2½ years of age, including defective children.

Finally, after seeing how rhythmic motor patterns have been used by normal children in facilitating normal growth and development and also by handicapped children to help achieve better adaptation, the potentialities of the use of such rhythmic activities as therapeutic tools with disturbed children should be considered. The observations reported here on the blind and cerebral palsied children may indicate that similar approaches might be more extensively attempted with other handicapped children. Bender and Boas (3) have successfully used music and creative dance in the study, therapy, and training of deviate children. In some schizophrenic children, their rhythmic patterns offer one of the few means through which they can be approached by a therapist in establishing the relationships so necessary for treatment.

SUMMARY

Rhythmic motor patterns are presented as a normal phenomenon in the infant, appearing to serve the purpose of satisfying an in-

stinctual need and facilitating motor and ego growth and development. Clinically, in the course of the child's use of such motor patterns, secondary values are often found to become prominent, and the repetitive movements then seem to serve other needs in addition to their organizing and mobilizing effects. Such secondary uses take the form of expression of pleasure, expression and relief of tension and anxiety, and provision of a form of compensatory satisfaction. In childhood schizophrenia they seem to represent also a regressive phenomenon. Such secondary values and uses of the stereotyped motor activity may cause the persistence of such patterns past the infantile period.

Investigations into the nature and sources of the rhythmic movements reveal that auditory, kinesthetic, tactile, and visual stimuli are their important components and that the auditory component is probably the most significant one in the head banger. The rate of the rhythmic movements seems to have a definite relationship to one of the time beats in the body, with usually the heart or breathing rate acting as the pacemaker.

The neurophysiological basis and the uses of the rhythmic movement are considered. Observations are offered as to the handling and treatment of such patterns where they have acquired psychopathological or nuisance value. Speculations are offered as to the possible use of rhythmic motor activities in therapy.

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